

CLOSED

Re-opening 28/03/2022

C d S
electronic kits

ABN 59 751 710 249

SOLAR TRACKER

INSTRUCTION SHEET

Solar Tracking kit

[Price - Stock No 215](#)

Motors with Gearboxes

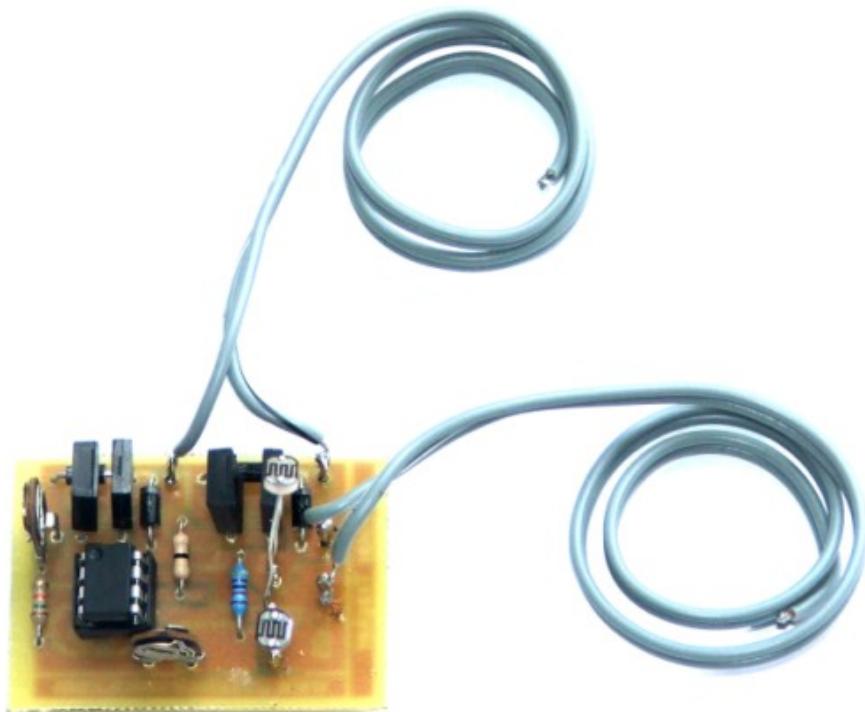
[Price - Stock No 750](#) 3v Gearbox 2.93RPM - 3000 RPM (6 configurations)

[Price - Stock No 751](#) 12V Gearbox 36 RPM

[Price - Stock No 752](#) 12V Gearbox 70 RPM

[Price - Stock No 753](#) 12V Gearbox 160 RPM

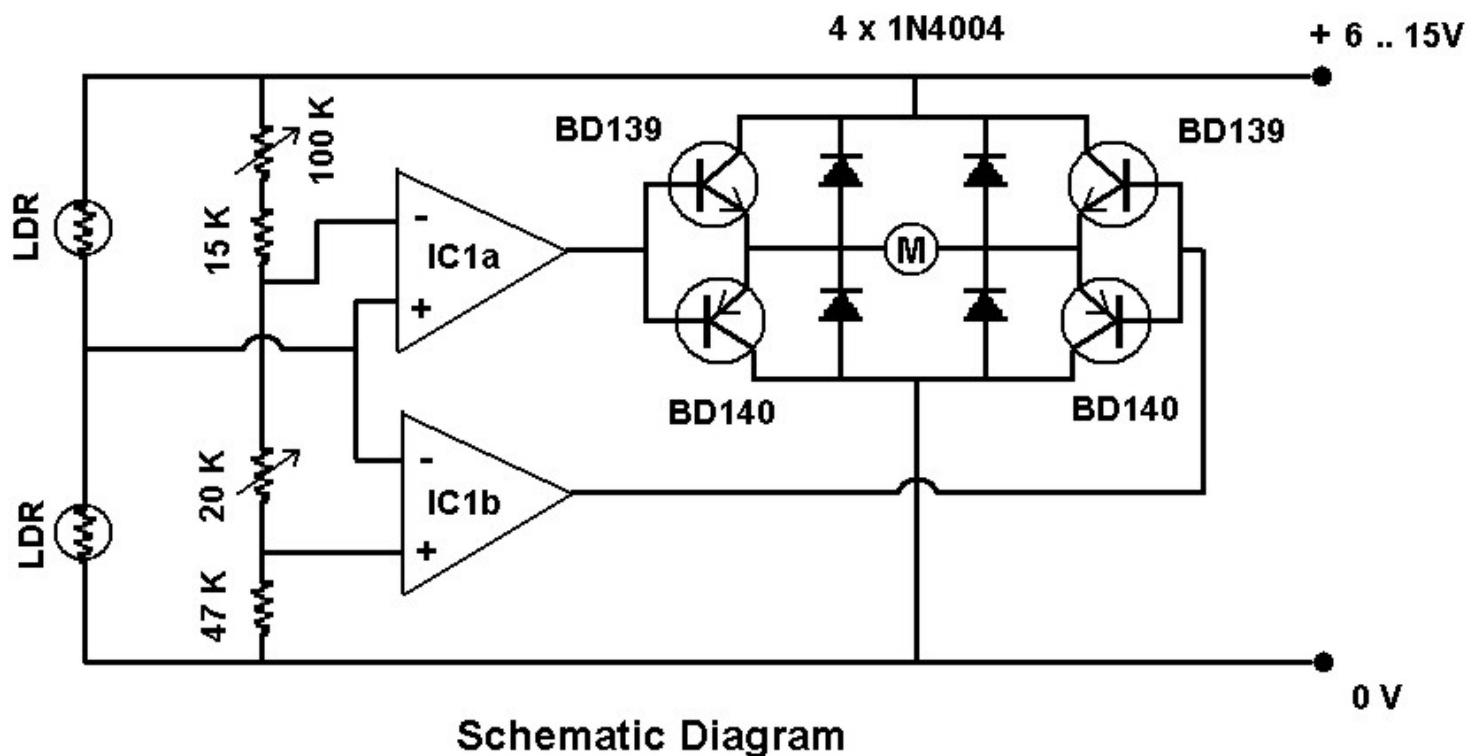
As the name suggests this kit is designed to track the sun - for use with a solar panel.



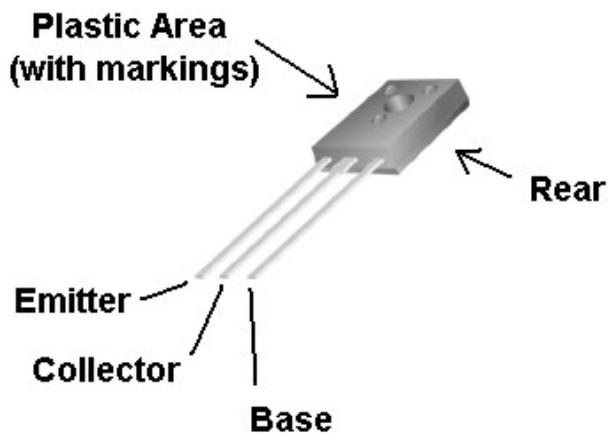
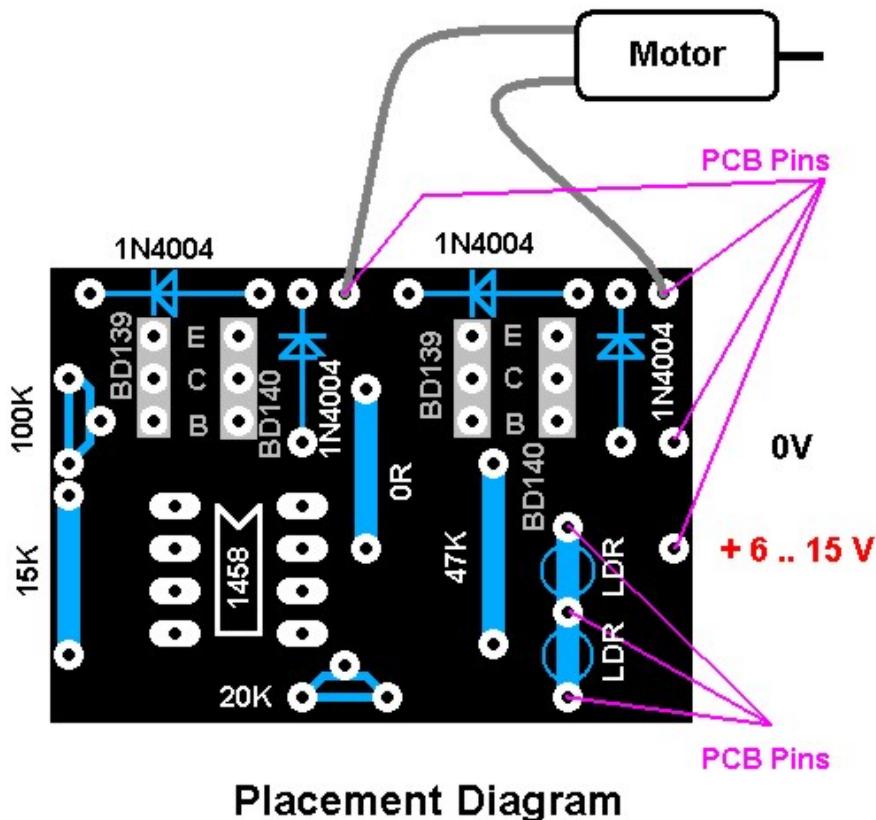
This kit monitors the position of the sun using two Light Dependant Resistors (LDR's), and makes the decision to move the solar panel to correctly orientate to the sun. The output configuration is called a H bridge which will drive a small electric gearbox up to 500mA at the input voltage (6 .. 15V), both forward and reverse.

It will not only track the sun, in the dark, it will track a bright light.

Light Tracking Crawler Video, Click to View:



IC1 - LM1458

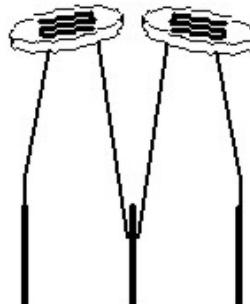


BD 139 & BD 140
TO - 126 Package

Construction

1. To make up the Kit, firstly check the PC Board for any damage. Check continuity of all tracks with a multimeter or an electronic circuit tester.
2. Identify the resistors using a multimeter or the [Resistor Colour Chart](#)
3. The three resistors can be bent to shape and fitted,
4. Solder in place - see [Soldering Technique](#).
5. The four diodes are polarised so care needs to be taken to position and orientate correctly, solder in place.

6. The IC socket can be carefully pushed into place. Ensure all the pins of the socket have come through the PCB and solder in place.
7. The two trimpots are different, identify, push in place and solder.
8. Pins are provided to terminate the input and output wires, and the LDR's (Light Dependant Resistors). Insert and solder the pins.
9. Use the above diagrams to orientate and insert the four transistors. Solder in place.



LDR Offset

- 10.
11. The LDR's need to be offset from one another. This angle facilitates the direction finding capability. Solder the LDR's to their PCB pins.
12. Cut the figure 8 wire into two appropriate lengths. Strip and tin the wire - see [Tinning wire](#).
13. Solder the wire lengths to the motor output and voltage input.
14. You will find that the legs of the IC are spread too wide to fit into the socket. Place the four legs on one side of the IC on the table and push gently so they are bent in slightly. Repeat for the other side. Find the locating DOT on the top surface of the IC, turn it so it matches the placement diagram and push it into its socket.

Setup and Testing

1. Check the supply voltage, we will call this +V
2. Connect a motor to the motor output terminals.
3. Point the LDR's so that they see about the same amount of light.
4. Adjust both trimpots completely anticlockwise.
5. Connect the supply voltage. The motor should run.
6. Adjust the 100K trimpot clockwise until the motor stops. Note the position.
7. Continue to adjust the trimpot clockwise until the motor runs in reverse. Note the position.
8. Bisect the angle between the positions in step 6 and step 7 and set the trimpot there. (This trimpot sets the balance point)
9. Rotate the 20K trimpot clockwise until the motor begins to hunt.
10. Back off in an anticlockwise direction until the motor is at a rest. (This trimpot sets the sensitivity)
11. Check for correct operation by shading each LDR in turn - checking that the motor direction reverses.

Technical Notes

If we look at the schematic, and particularly the motor control, the forward and reverse is achieved when the outputs of IC1a and IC1b are in different states. A truth table helps explain this:

IC1a Output	IC1b Output	Motor Behaviour
Low	Low	Stop
Low	High	Forward *
High	High	Stop
High	Low	Reverse *

*or vice versa - depending on motor connection

The transistors work in diagonal pairs to provide +ve & -ve to the motor terminals or -ve & +ve to the motor terminals for forward / reverse. See [Transistors](#).

The four power diodes protect the transistors from the voltage created by the motor in the instant(s) after the motor has been stopped. As the motor still has angular momentum, it will generate a voltage and current (Power). This power is capable of destroying the transistors and is bled off via the diodes. See [Diodes](#).

The input stage uses two operational amplifiers (contained in IC1) to make a decision on the direction of light. The op-amps are fed by the junction of the LDR's. If both LDR's see the same amount of light, their resistance is equal. The junction of the LDR's would be at input voltage divided by two ie. 12V input - junction of LDR's at 6V. If the light on one LDR is greater than the other, then the voltage will move, higher or lower depending on which LDR has more light.

Limits are set by the four resistors in series from +V to 0V, and adjusted by the two trim pots. If the voltage moves outside these limits, the respective op-amp will activate the motor and move the solar panel appropriately.

The 20K trim pot sets the sensitivity ie. the distance between these limits. The 100K trim pot adjusts so that these limits are symmetrical around +V/2 (balance point).

MORE INFORMATION

For more information on the LM1458 see [Datasheet for the LM1458](#).

TROUBLESHOOTING

Troubleshooting will consist of:

- ensure IC is inserted correctly
- check all components for values and location
- check all polarities
- resolder any or all joints

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